Standard Aircraft Characteristics

BY AUTHORITY OF
THE SECRETARY
OF THE AIR FORCE

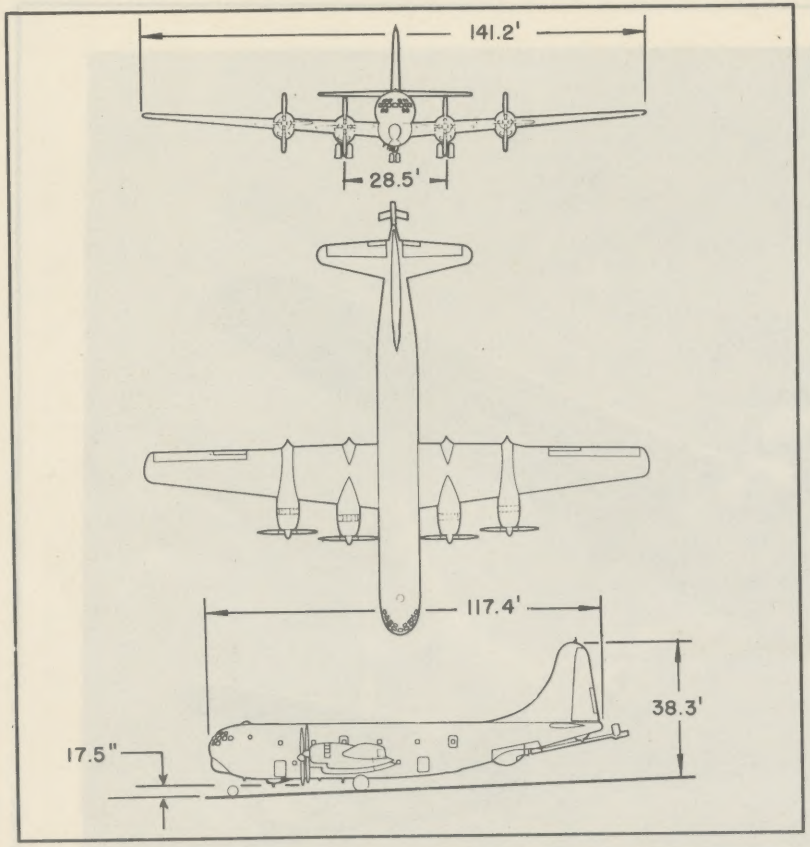
KC-97F

STRATOFREIGHTER

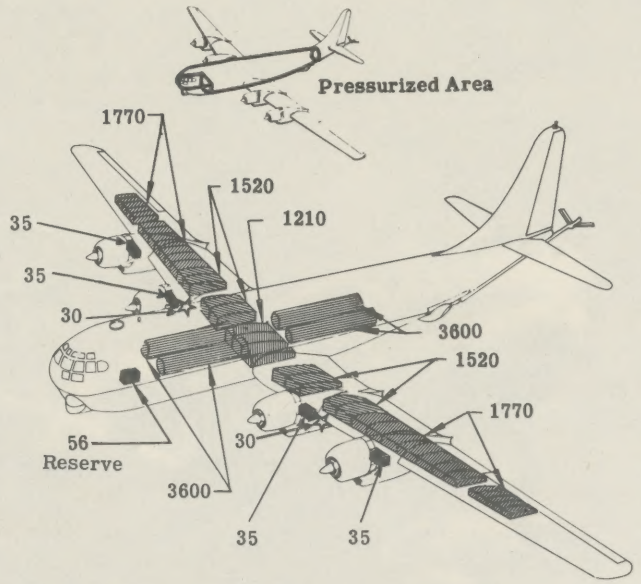
Boeing

FOUR R-4360-59B

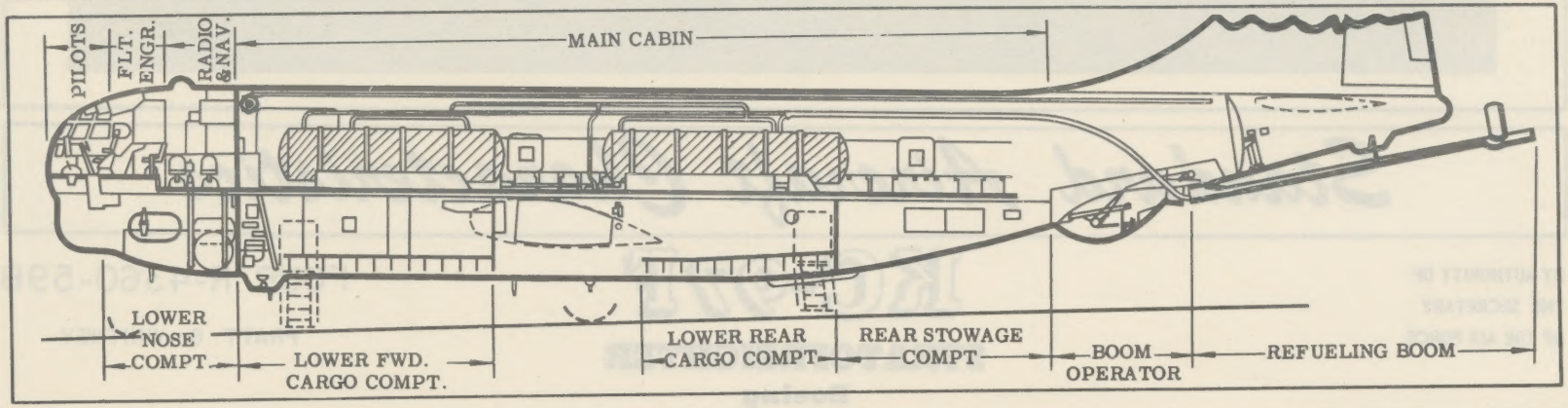
PRATT & WHITNEY



Wing Area	1768.7 sq ft	Wing Section	Boeing 117
Aspect Ratio	11.5	M.A.C.	154.4 in



▨ Fuel (Gal) ☆ Water Alcohol (Gal) ▬ Oil (Gal)



POWER PLANT

Nr. & Model	(4) R-4360-59B
Mfr	Pratt & Whitney
Engine Spec Nr.	A-7091-G
Supercl	1 stg, 1 spd
Turbo Superch	(4) BH-4
Turbo Mfr	General Electric
Red. Gear Ratio	0.375
Prop Mfr	Hamilton Std
Blade Design Nr.	2J17H3-8W
Prop Type	Hydra, FF, Rev'r
Nr. Blades	4
Prop Dia	16'6"
Augmentation	Water/Alcohol

ENGINE RATINGS

	BHP - RPM - ALT - MIN
T.O:	*3500 - 2700 - 500 - 5
	*3500 - 2800 - 500 - 5
Mil:	*3500 - 2700 - 500 - 30
	3250 - 2700 - 1000 - 30
Nor:	2650 - 2550 - 5500 - Cont

* Wet

Note: Increased altitude performance is available through use of external turbo supercharging.

Mission and Description

Navy Equivalent: None Mfr's Model: 367-76-29

The principal mission of the KC-97F (Tanker Version) is the long range aerial refueling of either reciprocating or jet engine aircraft at high altitudes by the "Flying Boom" method. To increase the versatility of this airplane, the AFR equipment may be removed and the airplane converted to a cargo-transport configuration.

This airplane is equipped and delivered with "Flying Boom" type refueling equipment, incorporating four 1800 gal fuel tanks installed in the main compartment, a boom operator's compartment and the Boeing aerial refueling boom. The airplane fuel system is interconnected with the AFR system so that the center section wing tank may be used for carrying jet fuel, making a total capacity of 8410 gal of jet fuel which can be transferred to receiver airplanes. If gasoline is carried all wing and AFR deck tank fuel, except fuel designated as reserve, may be transferred. Alternately, AFR deck tank fuel may be used to supplement wing tank fuel for long range ferry missions.

The KC-97F (Tanker Version) may be converted to a troop, cargo or casualty transport with no change required to the basic airplane structure. The equipment necessary to accomplish this conversion is supplied in a cargo conversion kit.

The operating crew consists of pilot, co-pilot, navigator, radio operator, flight engineer and boom operator. The flight engineer serves as pump operator during refueling operations.

Development

Same as the KC-97E except for installation of R-4360-59B engines in lieu of R-4360-65 and other minor changes.

Design Initiated	Oct 50
Mock-Up	Aug 51
First Flight	Feb 52
First Acceptance	Mar 52
Production Completed	May 53

WEIGHTS

Loading	LB	L. F.
Empty	84,218 (C)	
Basic	88,966 (C)	
Design	150,000	
Combat	*104,400	
Max T. O (overload)	†175,000	2.0
Max T. O (normal)	†153,000	2.5
Max Land	†175,000	

(C) Calculated
* For Basic Mission
† Limited by strength

Note: See page 6, note (c) for normal operating weights.

FUEL

Location	Nr. Tanks	Gal
Wgs, outbd	2	3540
Wgs, inbd	2	3040
Wg, ctr	1	1210
Fus, deck	4	7200
	Total	14,990
Grade		115/145
Specification		MIL-F-5572

OIL

Nac	4	140
Fus, fwd	1	56
	Total	196
Grade		1100
Specification		MIL-L-6082
WATER/ALCOHOL		
Wheel Well	2	(tot) 60

DIMENSIONS

Wing	
Span	141.2'
Incidence (root)	4°
(tip)	4°
Dihedral	4°29'
Sweepback (LE)	7°01'
Length (overall)	117.4'
Height	38.3'
Height (fin folded)	26.6'
Tread	28.5'
Prop Grd Clearance	17.5"

REFUEL EQUIP.

Telescopic Flying Boom

Articulated Boom Nozzle

Four (4) 1800 Gal Fuel Tanks

Rendezvous Radar

ELECTRONICS

VHF Command	AN/ARC-3
UHF Command	AN/ARC-27
HF Command Trm'r.	AN/ART-13A
HF Command Rec'r	BC-454B
Liaison	AN/ARC-8
Interphone	*AN/AIC-8
Radio Compass	AN/ARN-6
Marker Beacon	AN/ARN-12
Glide Path	AN/ARN-18
Interphone	†AN/AIC-10

*Aircraft AF-51-243 thru AF 51-371
†Aircraft AF-51-372 and subsequent

ELECTRONICS

Radio Altimeter	SCR-718C
Radio Altimeter	AN/APN-1
Omni-Direct Range	AN/ARN-14
Search Radar	AN/APS-42
Loran	AN/APN-9
IFF	AN/APX-6
Rendezvous Radar	AN/APN-12A
Rendezvous Radar	AN/APN-76
Radar Beacon	AN/APN-11
Emergency Keyer	*AN/ARA-26

*Aircraft AF 51-375 and subsequent

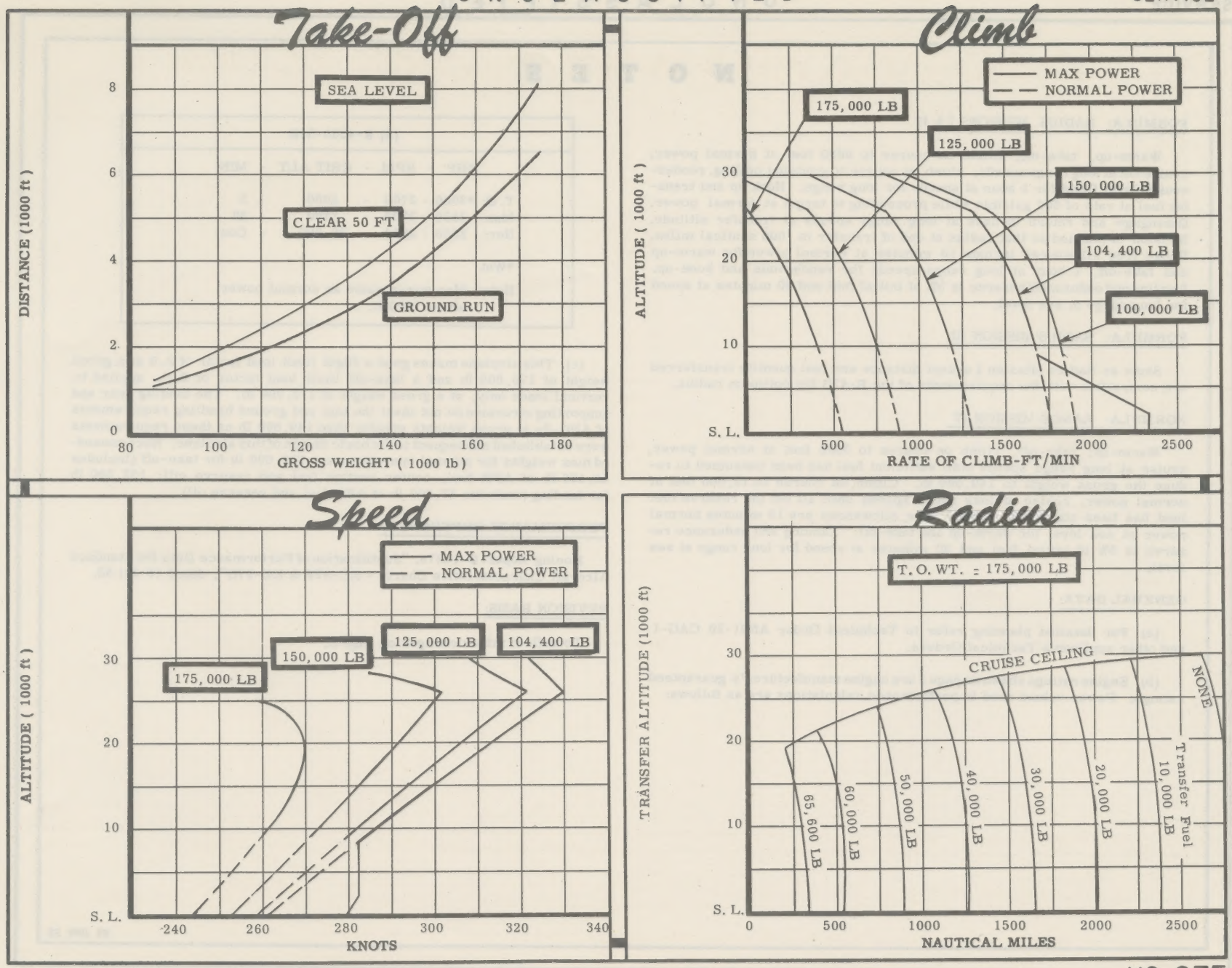
Loading and Performance—Typical Mission

CONDITIONS			BASIC MISSION	NORMAL MISSION	B-47 REFUEL	FERRY RANGE
			I	II	III	IV
TAKE-OFF WEIGHT		(lb)	175,000	153,000	175,000	175,000
Fuel at 6.0 lb/gal (Grade 115/145)		(lb)	41,344	36,464	29,119	83,784
Payload (Transfer Fuel)		(lb)	42,440	25,320	54,665	None
Wing loading		(lb/sq ft)	101.7	89.0	101.7	101.7
Stall speed (power off)		(kn)	108	100	108	108
Take-off ground run at SL	①	(ft)	6500	4400	6500	6500
Take-off to clear 50 ft	①	(ft)	8150	5500	8150	8150
Rate of climb at SL	③	(fpm)	575	860	575	575
Rate of climb at SL (one eng. out)	②	(fpm)	360	635	360	360
Time: SL to 10,000 ft	③	(min)	19.0	12.5	19.0	19.0
Time: SL to 20,000 ft	③	(min)	46.0	27.5	46.0	46.0
Service ceiling (100 fpm)	③	(ft)	22,500	28,300	22,500	22,500
Service ceiling (one eng. out)	②	(ft)	5600	14,200	5600	5600
COMBAT RANGE	④	(n. mi)	———	———	———	5680
Average speed		(kn)	———	———	———	208
Initial cruising altitude		(ft)	———	———	———	5000
Final cruising altitude		(ft)	———	———	———	15,000
Total mission time		(hr)	———	———	———	27.3
COMBAT RADIUS	④	(n. mi)	1000	1000	580	———
Average speed		(kn)	221	224	218	———
Initial cruising altitude		(ft)	5000	5000	5000	———
Final cruising altitude		(ft)	25,000	29,000	22,500	———
Total mission time		(hr)	10.0	9.9	6.3	———
COMBAT WEIGHT	⑤	(lb)	104,400	104,100	99,147	96,216
Combat altitude		(ft)	25,000	29,500	22,500	15,000
Combat speed	②	(kn)	327	324	323	303
Combat climb	②	(fpm)	1320	930	1560	1860
Combat ceiling (500 fpm)	②	(ft)	30,000+	30,000+	30,000+	30,000+
Service ceiling (100 fpm)	③	(ft)	30,000+	30,000+	30,000+	30,000+
Service ceiling (one eng. out)	③	(ft)	30,000+	30,000+	30,000+	30,000+
Rate of climb at SL	②	(fpm)	2380	2385	2570	2685
Max speed at 26,000 ft	②	(kn)	330	330	332	333
Basic speed at 5000 ft	②	(kn)	282	282	284	284
LANDING WEIGHT	⑤	(lb)	94,046	93,811	93,432	96,216
Ground roll at SL		(ft)	2045	2035	2025	2095
Total from 50 ft		(ft)	2985	2980	2975	3050

NOTES

① Take-off power
② Max power (Same as normal power above 7800 ft)
③ Normal power
④ Detailed descriptions of Radius and Range Missions are given on page 6
⑤ For Radius Mission if radius is shown.

Performance Basis:
(a) Data Source: Flight Test
(b) Performance is based on powers shown on page 6.


Take-Off
SEA LEVEL
CLEAR 50 FT
GROUND RUN
DISTANCE (1000 ft)
GROSS WEIGHT (1000 lb)
0
2
4
6
8
80
100
120
140
160
180
Climb
MAX POWER
NORMAL POWER
175, 000 LB
125, 000 LB
150, 000 LB
104, 400 LB
100, 000 LB
ALTITUDE (1000 ft)
RATE OF CLIMB-FT/MIN
S. L.
10
20
30
500
1000
1500
2000
2500
Speed
MAX POWER
NORMAL POWER
175, 000 LB
150, 000 LB
125, 000 LB
104, 400 LB
ALTITUDE (1000 ft)
KNOTS
S. L.
10
20
30
240
260
280
300
320
340
Radius
T. O. WT. = 175, 000 LB
CRUISE CEILING
NONE
65, 600 LB
60, 000 LB
50, 000 LB
40, 000 LB
30, 000 LB
20, 000 LB
10, 000 LB
Transfer Fuel
TRANSFER ALTITUDE (1000 ft)
NAUTICAL MILES
S. L.
10
20
30
0
500
1000
1500
2000
2500

NOTES

FORMULA: RADIUS MISSIONS I & II

Warm-up, take-off, climb on course to 5000 feet at normal power, cruise out at long range speeds, climb on course to cruising ceiling, rendezvous in level flight for 1 hour at speeds for long range. Hook up and transfer fuel at rate of 600 gal/min while proceeding to target at normal power. Disengage and return to base at long range speeds at transfer altitude. Mission is planned so that radius at end of transfer is 1000 nautical miles. Range free allowances include 10 minutes at normal power for warm-up and take-off, 1 hour at long range speeds for rendezvous and hook-up. Landing and endurance reserve is 5% of initial fuel and 30 minutes at speed for long range at sea level.

FORMULA: RADIUS MISSION III

Same as Radius Mission I except distance and fuel quantity transferred are compatible with the requirements of the B-47B for optimum radius.

FORMULA: RANGE MISSION IV

Warm-up, take-off, climb on course to 5000 feet at normal power, cruise at long range speeds until sufficient fuel has been consumed to reduce the gross weight to 140,000 lb. Climb on course to 15,000 feet at normal power, cruise at long range speeds until all but the reserve fuel load has been consumed. Range free allowances are 10 minutes normal power at sea level for warm-up and take-off. Landing and endurance reserve is 5% of initial fuel and 30 minutes at speed for long range at sea level.

GENERAL DATA:

(a) For detailed planning refer to Technical Order AN01-20 CAG-1 and other applicable Technical Orders.

(b) Engine ratings shown on page 3 are engine manufacturer's guaranteed ratings. Power values used in performance calculations are as follows:

(4) R-4360-59B				
	BHP	RPM	CRIT ALT	MIN
T.O:	*3500	2700	1000	5
Max:	3250	2700	1700	30
Nor:	2650	2550	26,000	Cont

*Wet

Note: Max power same as normal power above 7800 ft.

(c) This airplane makes good a flight limit load factor of 2.0 at a gross weight of 175,000 lb and a take-off limit load factor of 2.0, applied to vertical loads only, at a gross weight of 175,000 lb. The landing gear and supporting structure do not meet the taxi and ground handling requirements of ANC-2a at gross weights greater than 140,000 lb as these requirements were established subsequent to the basic design of this airplane. Recommended max weights for normal operations are 153,000 lb for take-off (includes 44,460 lb of AFR fuel, center section fuel and reserve oil); 132,500 lb for landing (includes 37,000 lb of AFR fuel and reserve oil).

PERFORMANCE REFERENCE:

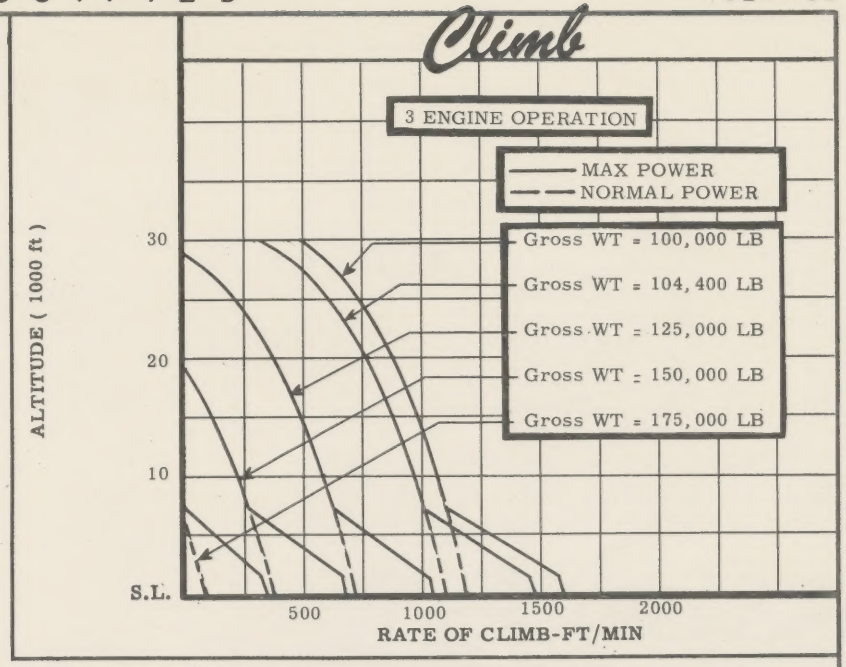
Boeing Report D-14378, "Justification of Performance Data for Standard Aircraft Characteristics Charts - KC-97F & KC-97G", dated 16 Jul 53.

REVISION BASIS:

To reflect minor changes on page 3.

23 JUN 53

Climb



Radius